Moving Forward

Harnessing data to improve business outcomes in travel and transportation

Highlights:

- The travel and transportation sector is on the verge of a transformative change.
- Data analytics can be used to model and optimize demand, capacity, schedules, revenue and cost.
- Smarter transportation means operational efficiency, increased agility, and an improved end-to-end experience for travelers and shippers.

Transportation serves as the circulatory system of civilization. For more than two centuries, advances in transportation—from canals, to railways, to air travel to containerized freight—helped create the modern world, allowing cities to thrive and changing the way we live and work. But today, as we consider the future of the world's transportation systems, we find ourselves at a crossroads.

Globalization, population growth and urbanization are overwhelming transportation systems around the world, many of which were built to accommodate a fraction of their current load. Over the last 50 years, international trade in manufactured goods grew 100 fold, straining global supply chains. In 1950, there were 83 cities with more than a million inhabitants. Today there are 479.[1]

The negative effects of these already overburdened systems are not hard to quantify. One in five U.S. scheduled flights in 2011 was delayed, often due to traffic congestion.[2] Less than half of container vessels arrive in port on schedule because of inadequate infrastructure.[3] And freight trains take 48 hours to move from the US west coast to Illinois, and then can take at least that long to pass through the congested Chicago rail network.[4]

Yet, even when demand slackens, the cost of excess capacity can erase profits. For example, the airline industry lost $26 billion in 2008 and 2009 due to falling demand and rising fuel prices.[5] And, unused capacity in maritime container fleets during 2011 led carriers to dramatically reduce rates, causing widespread losses.[6]

In addressing these inefficiencies, travel and transportation providers have a long list of challenges to confront, including:

- Economic stagnation and fluctuating demand
- Proliferation of sales channels, loss of market-making power, commoditization
- Demanding and empowered customers
- High fixed costs for equipment and infrastructure
- Fuel price volatility and cost escalation
- Environmental sustainability and new regulations
- Safety and security requirements

Though these challenges are daunting, the travel and transportation sector is on the verge of a transformative change. For the first time, we can monitor, measure and manage transportation operations in real time. We can collect and analyze data from multiple systems, recognize patterns and provide new insights. And, using those insights, we can make more informed decisions to drive better outcomes. In short, we can create smarter transportation systems.

Smarter travel and transportation

If we agree on the need for smarter transportation systems, the question is: how do we get there?

The key to smarter systems is not the computer chip, or the sensor, or the mobile device. It's not even smarter locomotives or aircraft. What we are learning from our travel and transportation clients around the world is that the key to smarter transportation is the data.

Thanks to an increasingly instrumented and interconnected planet, we're capturing data in unprecedented volumes. We're receiving enormous streams of data in real time, in structured and unstructured forms, from text to digital video, from sensors to cell phones. And, we're capturing it from nearly every kind of system or event imaginable, including reservation systems, supply chain interactions, social media, and even the wheel vibrations of a train.

But the most important aspect of this transformation is not simply the amount of data available. It's what the data can tell us. And to capture that, we need to dive deeper and move from "big data" to smarter data.

That's why analytics are so crucial. Analytics are sophisticated software tools that can detect patterns, spot correlations and provide insights from massive amounts of data. And not after the fact, but in real time.

Where we inferred; now we can know.
Where we estimated; now we can determine.
That's the promise of a smarter planet.

By marrying digital technology with physical infrastructure, we can analyze real-time data about how transportation networks are operating. Analytics can be used to model demand, capacity, schedules, revenue and cost. Customer behavior can be better understood to personalize marketing, sales and service. Operating plans can be optimized and rapidly reset during disruptions to normal service. We can use sensors to monitor equipment to avoid breakdowns. And security can be pursued with less obtrusion and cost.

These technologies are helping to define a more efficient and customer-oriented industry. And, they are enabling five critical imperatives across the travel and transportation sector:

- Improve the end-to-end experience for travelers and shippers
- Increase the agility of customer sales and service systems
- Maximize the availability of assets and infrastructure for revenue generation
- Improve operational efficiency and reduce environmental impact
- Assure safety and security with less cost and impact on customers

Smarter transportation is happening today

The travel and transportation sector can't be transformed overnight, because it's a massively complex system of individual operators. But important first steps are being taken, and the industry is getting smarter, one operator at a time.

Improving the end-to-end experience for travelers and shippers

The mantra of today's savvy consumer is: "Know me and serve me, don't sell me." In a smarter transportation system, travelers and freight shippers are given the information and tools to decide for themselves the best way to get from origin to destination, across modes of transport, considering cost, time and convenience. Travelers receive instant alerts, schedule changes and personalized offers. And, freight customers can simplify supply-chain planning, manage cost, and track shipments from door to door.

For example, Air Canada developed a smartphone application that allows passengers to download electronic boarding passes, check in, view flight status, book rental cars and more. The app saves 80 percent of the cost per check-in, compared to counter service, and has resulted in a 60 percent increase in mobile check-ins. Plus, 93 percent of Air Canada passengers say the self-service option improves their travel experience. Air Canada also is exploring how analytics can be applied to scheduling flights and reducing fuel consumption.

Increasing the agility of customer sales and service systems

Complex back-office systems have often made it difficult for travel companies to execute their business strategies. Modern sales and service systems can support fluid distribution models, bring new services to market faster and provide consistent information for customers across all channels and service points.

In order to achieve several of its strategic business objectives, Lufthansa reengineered its Web portal. The airline needed to attract more online shoppers, increase scalability to support growth, reduce time to market for new offerings and lower the cost per transaction. With the new portal, Lufthansa increased online bookings by 37 percent in 2009 and 29 percent in 2010. Plus, the cost to operate the portal was reduced by 20 percent on day one. And, during the 2010 Icelandic volcano eruption, Lufthansa handled 70 percent more online transactions and 22 times more flight status requests without service degradation.

Maximizing the availability of assets and infrastructure for revenue generation

Transportation operators depend on large, expensive networks of infrastructure and equipment. Managing and maintaining these assets to achieve maximum availability is critical to increasing revenue and controlling cost. Asset management and maintenance systems using analytics can help improve uptime and equipment life with less cost.

For example, the Swiss railway Schweizerische Bundesbahnen (SBB) monitors rail infrastructure in real time and resolves more than 50 percent of issues before they affect train operation. Availability of the train network has increased by 33 hours per month system-wide.

Improving operational efficiency while reducing environmental impact

Planning and executing the efficient deployment of physical and human resources is a massive undertaking for any transportation provider, which is often made more difficult by unexpected events. Analytics can improve the planning and execution of operations, optimizing resource use and reacting quickly when the situation changes.

Rosenau Transport is a Canadian trucking company with a remarkable strategy: compete by making service more important than price. Sophisticated analytics tools use real-time data from on-board computers to automatically reroute trucks around traffic delays, saving time and fuel. The solution provides instant shipment status to customers so they can plan accordingly. And, data from on-board sensors is used to optimize fuel consumption and keep trucks in peak condition, reducing environmental impact.

Assuring safety and security

Safety and security can't be compromised, regardless of challenging economic conditions. Fortunately, smarter systems can help identify risks with reduced cost. Video cameras and sensors scan rail lines and terminals while analytic tools identify risks that a human might miss. A smarter system can detect security threats through analysis of passenger information, biometric identification and surveillance.

Rete Ferroviaria Italiana secures its 16,300-kilometer rail network with intelligent video surveillance. Previously, the railway had a serious problem caused by vandalism and theft. Its video analysis system now monitors more than 100 sites, including terminals, power stations and bridges. Without human monitoring, the solution recognizes suspicious activity and alerts security guards. The results: less cost, more effective use of security personnel and more reliable risk detection.

With smarter transportation systems, we can improve customer service, operate more efficiently and assure safety. IBM® is helping clients in all modes of travel and transportation harness their data, using the power of analytics to address these challenges. The technology is available today to generate improved financial performance for providers, and give travelers and shippers what they really want: smooth, seamless door-to-door transportation. Let's work together to build smarter transportation.

For more information

For more information on IBM's work with smarter travel and transportation, visit **ibm.com**/smarterplanet/transportation.

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1 Thomas Brinkhoff, The Principal Agglomerations of the World, October 1, 2011, http://www.citypopulation.de/world/Agglomerations.html (December 19, 2011)

2 US Department of Transportation, Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics, 2009, http://www.transtats.bts.gov/HomeDrillChart.asp (December 19, 2011)

3 Speech by Ron Widdows, CEO of APL, to the 2007 European Conference of Ministers of Transport, Sofia, Bulgaria, June 8, 2007, http://www.sdcexec.com/news/10358780/transport-congestion-seen-imperiling-global-economy (December 19, 2011)

4 American Society of Civil Engineers, Report Card for America's Infrastructure, 2010, Illinois, Rail, http://www.infrastructurereportcard.org/node/179 (December 19, 2011)

5 Air Transport World, ATW Staff, The World Airlines Report, 2011. http://atwonline.com/airline-finance-data/article/world-airline-report-0630 and Perry Flint, Air Transport World, The World Airlines Report, 2010. http://atwonline.com/airline-finance-data/article/world-airline-report-0701 (December 19, 2011)

6 Peter T. Leach, Journal of Commerce, http://www.joc.com/container-shipping/trans-pacific-rates-hit-23-month-low (December 19, 2011)

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